

REMARKS

Claims 1-13, as amended, and new claims 14-17 now appear in this application for the Examiner's review and consideration.

Claim 1 has been amended to recite that the stabilizing agent is a nucleophile that contains at least one atom of sulfur or nitrogen for providing at least one lone pair of electrons for reaction, and that the stabilized aroma-providing component is separately stored prior to combining it with a further component of a food, beverage, food-forming or beverage-forming material and optionally with a liquid to form a product for consumption. Support for these changes is provided by the specification and original claims such as claims 2 and 7. Claim 2 has been amended to be consistent with claim 1, while the new claims have been added to cover additional preferred embodiments that are disclosed in the specification. As no new matter has been introduced, the entry of these claim changes at this time is warranted.

The office action notes that certain copending applications disclose similar subject matter and that a clear line of demarcation needs to be maintained between these applications. Applicants submits that this has been done since the claims of this application are directed to a process for stabilizing an aroma-providing component, while those of application no. 10/661,432 are directed to a method for preparing an aroma-containing component which releases an aroma having increased amounts of desirable flavor or sensory characteristics during preparation of a food or beverage product, and those of application no. 10/661,397 are directed to a process for stabilizing an aroma-providing component the stabilized aroma-providing component or the combination of that component and a foodstuff where the component and foodstuff are separately stored. It is respectfully submitted that the claims of these applications would have been subject to restriction if presented in a single application, and applicants has simply filed separate applications to separately pursue patent protection for these embodiments.

In response to the notation in the office action that a copy of Chinese application CN 1109277 as listed on the PTO-1449 was not received by the office, applicants submits herewith a copy of an English abstract for that document. It is respectfully submitted that no additional fee is needed for the Examiner to consider these references, but if any additional fees are required, they may be charged to the deposit account noted herein.

The claims were rejected for lack of enablement for the reasons set forth in the office action. While the Examiner's interpretation of the claim term is correct, applicants have now

amended claim 1 as noted above to emphasize that the stabilizing agent is a nucleophile that contains at least one atom of sulfur or nitrogen for providing at least one lone pair of electrons for reaction. This enables the stabilizing agent to chemically interact with undesirable compounds to form a stabilized aroma-providing component which either retains a significant portion of one or more of the desirable flavor or sensory characteristics of the aroma in the aroma-containing component during storage, or reduces off flavor generation during storage of the aroma-providing component. The specification includes a number of examples of these nucleophiles, including SO<sub>2</sub>, a sulfite or a substance that contains or generates a sulfite, a thiol, an amine or an amino acid, and in particular, cysteine or glutathione or their salts or an enzyme. In view of this amendment, the enablement rejection has been overcome and it should be withdrawn.

The claims were rejected over either of Reich US patent 3,421,906 or Belrhlid et al. (“Belrhlid”) European patent application 963,706 for the reasons set forth on pages 3-4 of the action.

Before addressing these rejections, a brief review of the presently claimed invention may prove helpful. The present claims recite a process for stabilizing an aroma-providing component against loss or degradation of desirable flavor or sensory characteristics of its aroma during storage. This process includes the step of associating the aroma-providing component with a stabilizing agent of a nucleophile that contains at least one atom of sulfur or nitrogen for providing at least one lone pair of electrons for reaction with other compounds in the component. The stabilizing agent is advantageously present in an amount effective to chemically interact with undesirable compounds to form a stabilized aroma-providing component which (a) retains a significant portion of one or more of the desirable flavor or sensory characteristics of the aroma in the aroma-containing component during storage, or (b) reduces off flavor generation during storage of the aroma-providing component. The process also includes the step of separately storing the stabilized aroma-providing component prior to combining it with a further component of a food, beverage, food-forming or beverage-forming material and optionally with a liquid to form a product for consumption. By doing this the resultant product contains an improved or enhanced aroma compared to one prepared with an unstabilized aroma-providing component.

In contrast, Reich discloses a method for treating roasted coffee to avoid staling. That method includes the treatment of coffee with sulfur dioxide or a salt that releases sulfur dioxide in combination with ammonia to remove acrid sulfur dioxide odors. This treatment

is performed to stabilize coffee flavor and aroma so that without introducing objectionable aromas or odors. This results in the retention of the desirable coffee flavors and aromas while also preventing staling of the coffee during packaging and storage. To do this, Reich adds sulfur dioxide vapor directly to the coffee, such as by introducing it into the grinding chamber of the mill used to grind roast coffee either along with or preceded by a stream of ammonia. Thereafter, Reich subjects the treated coffee to carbon dioxide stripping to remove the sulfur dioxide and ammonia vapors before packaging the treated product.

The present invention, as defined in claim 1, is patentable over Reich because Reich does not disclose the separate storage of the stabilized aroma-providing component prior to combining that component with a further component of a food, beverage, food-forming or beverage-forming material and optionally with a liquid to form a product for consumption. Instead, Reich either (1) combines a stabilizing agent such as sulfur dioxide with the ground coffee to treat it, but does *not* form a beverage or food product from a stabilized aroma-providing component, or (2) treats the coffee and then *removes* the agent prior to packaging and subsequent formation of a beverage. The present invention provides significant improvements in the aroma of the resulting product by maintaining the stabilized aroma-providing ingredient (i.e., the combination of the stabilizing agent and the aroma-providing ingredient) during packaging and storage so that, when a beverage or food is formed with the stabilized aroma-providing ingredient, improved and enhanced aroma is obtained in the product compared to products prepared with an unstabilized aroma-providing component.

Reich illustrates the drawbacks in his invention by noting in Example 1 that upon several weeks storage, the flavor and aroma of the treated sample was preserved *although somewhat diminished*. The present invention avoids the diminishment of flavor and aroma by packaging the stabilized aroma-providing ingredient until needed for the preparation of a product for consumption so that optimum flavor and aroma characters can be obtained in the product. Thus, claim 1 is patentable over Reich for these reasons.

Claims 12-13, 15 and 17 are further patentable over Reich since the specific stabilized aroma-providing ingredients of those claims are not disclosed in Reich. As noted above, Reich does have a stabilizer in contact with ground coffee at one point in the process, but he either does not use that combination to form a beverage for consumption or he separates out the stabilizing agent prior to packaging the coffee which is later used to make a beverage for consumption.

For coffee aroma, for example, the addition of the stabilizing agent according to the

present invention has been found to extend the shelf life to allow the aroma, after storage for extended periods of time, to retain a flavor which is reminiscent of freshly brewed coffee in various coffee beverages that are reconstituted after storage of the aroma. It is believed that several mechanisms are occurring to achieve the stability and increased storage life of the fresh flavor, with one or a combination of these mechanisms occurring simultaneously to achieve the improvements:

the stabilizing agent reacts with carbonyl groups contained in compounds such as aldehydes or ketones to form adducts which do not react with the other coffee aroma compounds to decrease the overall flavor characteristics;

the stabilizing agent cleavages disulfide bonds to promote levels of desirable free thiols;

the stabilizing agent acts as an oxygen scavenger to prevent deterioration of the flavor characteristics of the coffee aroma due to oxidation;

the stabilizing agent acts as an anti-oxidant to prevent free radicals and other oxidizing compounds from deteriorating the flavor characteristics of the aroma due to oxidation;

these endogenous antioxidant activities preserve thiol and pyrrole degradation over time;

the stabilizing agent reduces or controls undesirable browning, polymerization, or condensation reactions, or

the stabilizing agent binds carbonyls during storage at least some or all of which are released upon reconstitution into beverage.

In addition, the presence of aldehydes, such as acetaldehyde, causes the flavors to degrade. The stabilizing agent reacts with the aldehyde to form aldehyde derivatives that do not negatively impact the stability of the coffee aroma-providing component. For this reason, C-nucleophiles, such as 1,3-dicarbonyl compounds and various thiazolium salts are particularly useful stabilizing agents. For example, thiamin (Vitamin B1) is known to react with aldehydes to form aldehyde derivatives component that do not deleteriously affect the coffee-aroma providing component.

In conventional non-treated or non-stabilized coffee aroma, the amounts of methanethiol and pyrrole typically degrade or diminish to almost undetectable levels over the course of several months when the components are stored at room temperature. Even if the

stabilizer is added to the final product that contains a non-stabilized aroma providing component, these volatiles are substantially degraded because the stabilizer is added to the whole food matrix and is integrated therewith so that less of it is available to interact with the aroma-providing component. In contrast, the treated or stabilized aroma-providing components of the invention are characterized by a significantly reduced degradation profile compared to the conventional components. The methane thiol and pyrrole levels remain at more than 30% of the initial levels after storage at ambient temperature over a period of at least 6 months.

In addition, Reich does not disclose making a food or beverage product from a first component of a food, beverage, a food-forming component or a beverage-forming component, and a second component of the previously described stabilized aroma-providing component wherein the stabilized aroma-providing component is separately stored from the first component. As noted, Reich removes the stabilizer from the product prior to storage, whereas applicants store the stabilized component separately from the food or beverage forming component prior to formation of the product so that, upon preparation, the unexpected advantages in flavor and aroma can be achieved. Claim 14 specifically recites that the stabilized aroma-providing component retains the desirable flavor or sensory characteristic of the aroma for at least six months during storage. Thus, all rejections based on Reich have been overcome and should be withdrawn.

Belrlhid discloses a precursor mixture of flavorings that includes at least one polysulfide and at least one non-volatile source of sulfur having at least one sulphydryl group. The precursor mixture generates an aromatic note when it is heated due to the formation of thiols. The polysulfide is present in an amount sufficient to generate a thiol when heated to provide a roasted or grilled aromatic note. The non-volatile source of sulfur includes at least one sulphydryl group and is present in an amount sufficient to react with the polysulfide to form the thiol and release of the aromatic note when the precursor mixture is heated. Example 1 illustrates the addition of a precursor mixture of bis (2-furfuryl) dioxide and  $\beta$ -lactoglobulin to hot water (100C) with soluble coffee to form a flavored beverage.

Belrlhid does not disclose that a stabilizing agent is present with the aroma-providing component and that it is stored separately prior to combining the stabilized aroma-providing component with a further component of a food, beverage, food-forming or beverage-forming material and optionally with a liquid to form a product for consumption. Instead, Belrlhid discloses a precursor mixture of flavorings that generate a grilled note (or similar flavors)

when heated. The present invention is instead directed at providing significant improvements in the *aroma* of the resulting product by maintaining the stabilized aroma-providing ingredient (i.e., the combination of the stabilizing agent and the aroma-providing ingredient) during packaging and storage so that, when a beverage or food is formed with the stabilized aroma-providing ingredient, improved and enhanced aroma is obtained in the product compared to products prepared with an unstabilized aroma-providing component. One of ordinary skill in the art would recognize the difference between the use of a flavoring agent for taste improvement compared to the stabilization of an aroma-providing ingredient to provide aroma improvement, so that the rejection of claim 1 over Belrhlid should be withdrawn.

In addition, claims 12-13, 15 and 17 are further patentable over Belrhlid since the specific stabilized aroma-providing ingredients of those claims are not disclosed in Belrhlid. Belrhlid simply does have a stabilizer in contact with coffee, tea, malt or the other aroma-providing components recited in those claims .

Claim 14 is also patentable over Belrhlid. Belrhlid does not disclose forming a food or beverage product by combining a first component of a food, beverage, a food-forming component or a beverage-forming component and a second component of the previously described stabilized aroma-providing component wherein the stabilized aroma-providing component is separately stored from the first component until the combination is to be used to prepare a food or beverage product for consumption. As noted, Belrhlid is not concerned with the stabilization of an aroma and instead is concerned with flavor modification when heat is added to a product. In contrast, applicants provide a combination where a separately stored stabilized aroma-providing component is included with a food or beverage forming component so that, upon preparation, unexpected advantages in aroma can be achieved. When aroma-providing components such as coffee aroma are stabilized as taught by the present invention, significant benefits are achieved as explained above and as further explained in the specification. In view of the preceding, it is respectfully submitted that all rejections based on Belrhlid have been overcome and should be withdrawn.

Accordingly, the entire application is now believed to be in condition for allowance, early notice of which would be appreciated. Should the Examiner not agree that all claims are

patentable, then a personal or telephonic interview is respectfully requested to discuss any remaining issues in order to expedite the eventual allowance of this application.

Respectfully submitted,

Date: 9/10/04

  
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In the Claims: (7228)

The following listing of claims replaces all previous listings and versions:

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## Method for producing mineral wulong tea drink

Patent Number: CN1109277  
Publication date: 1995-10-04  
Inventor(s): YANQUN YANG (CN); YANQING YANG (CN)  
Applicant(s): KANGJIAMEI HEALTH PRODUCT CO L (CN)  
Requested Patent: CN1109277  
Application Number: CN19940116898 19941010  
Priority Number(s): CN19940116898 19941010  
IPC Classification: A23F3/16  
EC Classification:  
Equivalents: CN1060619B

### Abstract

The main characteristic of the method is to heat a specific amount of high grade mineral water to 82 deg.C, then 0.5% of sodium sulfite stabilizer is added in and dissolved by stirring, then the wulong tea is added in to extract by thermal preservation, after three stages of filtering and superhigh temp. instant bactericidal processing, the wulong tea drink is bottled. Said method features simple equipment, less investment, the product having the special flavour of wulong tea and capable of long term preserving.

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